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Coldplate of Pin Fin Design Makes Efficient Heat Exchanger

The problem:

To efficiently remove heat from heat-generating electronic equipment in confined areas that limit or deny conventional convective action. Coldplates using liquid coolants frequently present problems of bulk, weight, and excessive pumping requirements.

The solution:

A coldplate that is flat and hollow to permit the flow of coolant liquid within it. Heat-generating electronic equipment is mounted to one flat surface of the coldplate, which attracts the generated heat by conduction. The two major walls of the coldplate are joined by metal pins of high thermal conductivity, arranged in a pattern that is custom designed to best accommodate the thermal profile of a specific heat-generating electronic device. By conduction, heat is removed from the electronic equipment-mounting face of the coldplate along the thermal paths of the pins into the flowing coolant liquid, which carries the heat away by convection. Baffles are designed and placed within the coldplate to eliminate stagnant or non-flow areas and to direct flow distribution to provide adequate volume to areas of high heat generation.

Notes:

1. By design of pin field configuration within the coldplate, coupled with baffle placement and flow rate control, heat-generating electronic equipment in a wide range of configurations with varying heat producing components may be operated at design temperatures.
2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Manned Spacecraft Center
Houston, Texas 77058
Reference: B67-10073

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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